

## CLAIMS

1. A method for assigning a spreading code to a communication device which is part of CDMA communication system in which a plurality of communication devices receive and/or transmit signals encoded by respective spreading codes, the method comprising the steps of:

deriving parameters of a multipath signal propagation channel for the device;

- computing for each of a set of possible spreading codes a respective performance value using said derived channel parameters and an auto-correlation function of the corresponding spreading code;

selecting one of the possible spreading codes based on the performance values; and

assigning said selected spreading code to said device.

2. A method according to claim 1 in which said performance value of the k-th code is a value  $m(k)$  given by  $m(k) = \text{Re}[\sum_{j=0}^{L-1} c^*(j) \sum_{i=0}^{L-1} c(i) r_i(k, i-j)]$ , where  $i$  is an integer  $i = 0, \dots, L-1$ , the  $L$  values  $\{c(i)\}$  are said derived parameters, each corresponding to a respective delay of  $i$  chip periods, and  $r_i(k, i)$  is the auto-correlation of the k-th code at a delay of  $i$  chip periods.

3. A method according to claim 1 or claim 2 in which said selection step includes:

- (1) assessing which of the set of possible spreading codes has the highest performance value;
- (2) determining whether that spreading code fulfils one or more acceptance criteria,

(3) if in step (2) it is determined that that code fulfils the or each acceptance criterion, assigning that code to the device, and otherwise excluding that code from the set of possible spreading codes and returning to step (1).

5 4. A method according to claim 3 in which one said acceptance criterion is that the code is not presently in use by another device.

5. A method according to any preceding claim in which said step of deriving parameters is performed by measurement of a CDMA signal received by the device.

10 6. A communication device for use in a CDMA communication system in which a plurality of communication devices receive and/or transmit signals encoded by respective spreading codes, the device comprising:

antenna means for receiving CDMA signals;

15 decoding means for decoding the CDMA signals using a spreading code associated with the device;

means for deriving parameters of a multipath signal propagation channel associated with the antenna;

20 means for computing for each of a set of possible spreading codes a respective performance value using said derived channel parameters and an auto-correlation function of the corresponding spreading code;

means for selecting one of the possible spreading codes based on the performance values.

7. A device according to claim 6 in which said performance value of the k-th code is a function  $m(k)$  given by  $m(k) = \text{Re}[\sum_{j=0}^{L-1} c^*(j) \sum_{i=0}^{L-1} c(i) r_s(k, i-j)]$ , where  $i$

is an integer  $i = 0, \dots, L-1$ , the  $L$  values  $\{c(i)\}$  are said derived parameters, each corresponding to a respective delay of  $i$  chip periods, and  $r_s(k, i)$  is the auto-correlation of the  $k$ -th code at a delay of  $i$  chip periods.

8. A device according to claim 6 or claim 7 in which said device includes:

5        assessment means for assessing which of the set of possible  
spreading codes has the highest performance value;

means for transmitting to a resource allocating centre a proposal that the spreading code with the highest performance value is associated with the device, and determining whether that centre accepts the proposal;

control means arranged, upon determining that the centre accepts the proposal, to transmit the spreading code with the highest performance value to the decoding means, and, upon determining that the centre rejects the proposal, to trigger said assessment means to operate again excluding the spreading code with the highest performance value from the set of possible spreading codes.

9. A CDMA communication system comprising a plurality of communication devices which receive and/or transmit signals encoded by respective spreading codes, and a resource allocation centre,

each device being arranged to use channel parameters of a channel  
20 associated with that device, and a respective auto-correlation function for  
each of a plurality of spreading codes, to generate a proposal for a spreading  
code to be associated with that device, and submit the proposal to the  
resource allocation centre;

the resource allocation centre being arranged to receive the proposals,  
25 determine if they meet approval criteria, and accordingly transmit approvals or  
disapprovals to the devices.